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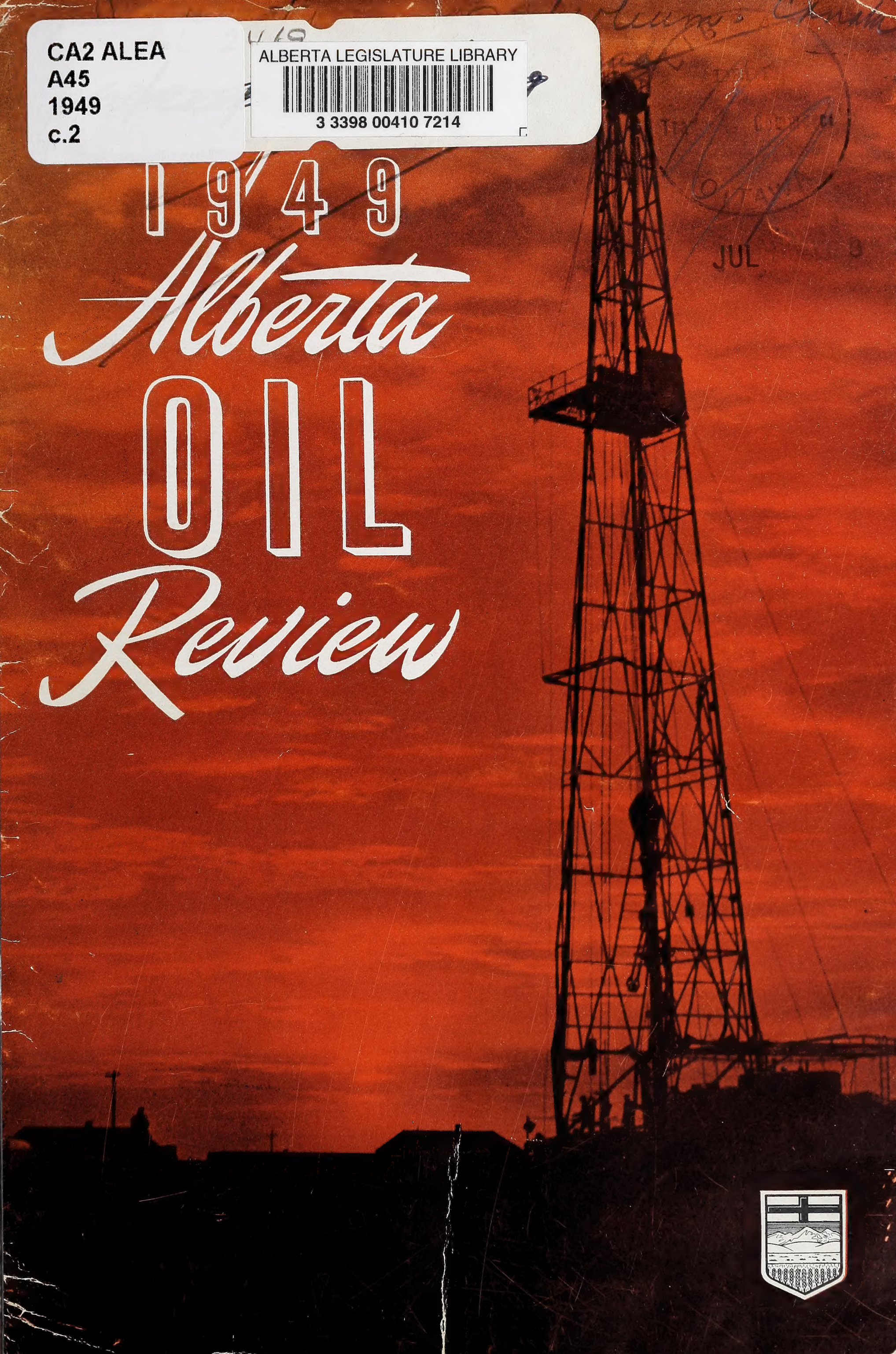
1949
Alberta
OIL
Review



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Alberta 1949 Oil Review

PREPARED BY
DEPARTMENT OF ECONOMIC AFFAIRS

TWO years ago Alberta oilmen noted with satisfaction that the production curve which had been drooping for several years had again turned upward, and some permitted themselves to indulge in the optimism that the 1948 output might approach the 10-million barrel record of 1942. Their most sanguine hopes were more than realized when that year's production topped even this figure by just a little over eight per cent.

Again in 1949 they hitched their wagon to a star, and in that year production of crude oil and natural gasoline reached the surprising figure 20,246,466 barrels (1) valued at $58,999,936 — over 80 per cent more in volume and more than 60 per cent more in value than the former record.

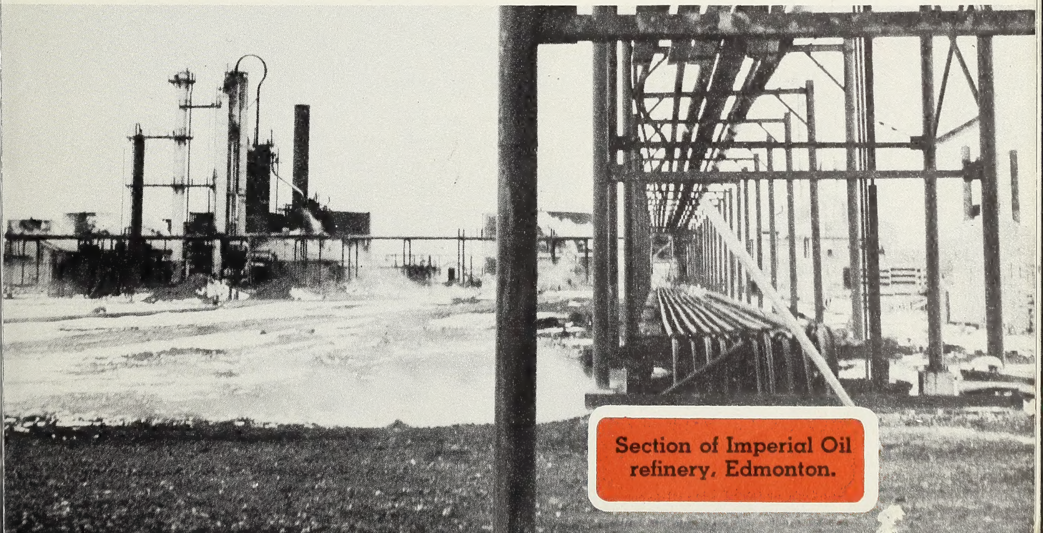
Graphs included in these pages tell the story of 1949 production, and if it is noted that the curve turns downward after September for all fields except Redwater this is because of "market allowables" imposed by the Prairie refineries which had reached their capacity to handle the output — 60,000 to 65,000 barrels a day (2) — combined with uneconomical cost of transporting the surplus by rail. (The Redwater allowable toward the end of the year was reduced from 70 to 65 barrels.)

This does not imply unreasonable freight rates on the part of the railways, whose co-operation no one admits more readily, more gratefully than the oilmen. The fact remains that it costs $1.86 to move a barrel of petroleum the same distance by rail as it costs 55 cents to move by pipeline. These twin obstacles will be removed by completion of the Interprovincial pipeline to the refinery at Regina, Sask., by the autumn of 1950 and its extension to Superior, Wis., in 1951 in time for the opening of lakewise navigation to the refineries at Sarnia, Ont.

It was discovery of the Leduc field in February, 1947, and the rapid sequence of events which followed that precipi-

(1) "Barrel" wherever it occurs in this text means a barrel of 35 imperial gallons.

(2) T. S. Johnston, president of Interprovincial Pipeline Company, Limited, has estimated that Alberta wells could now produce 125,000 barrels a day.

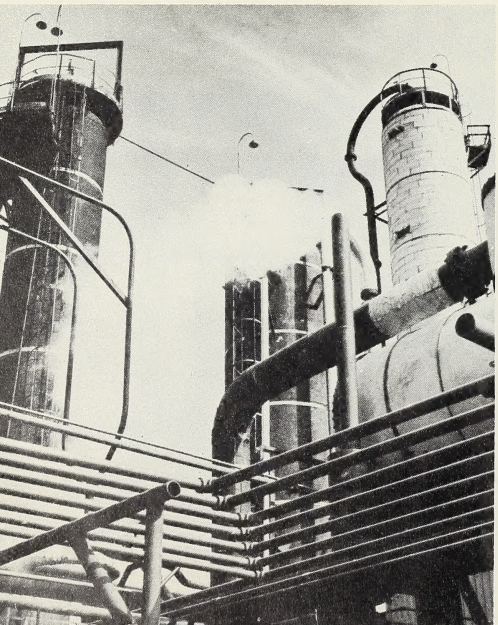


Section of Imperial Oil refinery, Edmonton.

tated the planning of this pipeline, for it was immediately apparent that all estimated reserves of Alberta petroleum would have to be drastically reviewed. At the time of the Leduc discovery, reserves were estimated at 35 million barrels, at the end of that year at 150 million barrels, in 1948 at 400 million barrels and in 1949 at 1,830 millions. It was on the basis of approximately this last figure that the pipeline system was designed, considered sufficient to keep it fed at its initial rate for 25 years. Addressing the Empire Club in Toronto in December, Dr. O. B. Hopkins predicted that when the pipeline is operating reserves will probably have increased to 2,000 million barrels.

All Alberta fields combined in 1949 to produce 20,246,466 barrels. That is to say, this one year's output is very nearly equal, in spite of market allowables, to the whole Alberta production since its beginning in 1914 almost until the eve of World War II. In 35 years the cumulative production until the end of 1949 reached a total of 128,354,723 barrels.

In 1949, 95 per cent of exploration for oil in Canada was concentrated in Alberta. Of 102 geophysical units working the Prairie provinces at the close of the year 85 were working Alberta, 17 Saskatchewan and two Manitoba. "Before Leduc" there were only 15 such parties in Alberta.



Until discovery of the Leduc field, Alberta enjoyed the reputation of the British Empire's second largest oilfield. Within 18 months of that event the Alberta field had surpassed its rival, Trinidad.

As the year closed there were 1,219 listed operating wells in the province producing a daily average of 54,606 barrels. This compares with 717 wells at the close of 1948 averaging 37,785 barrels of crude oil daily, an increase of 70 per cent in the number of wells. To the 1949 figure must be added 1,491 barrels and 1,325 to the 1948, production of natural gasoline in Turner Valley.

The effect of stringent market allowables can be seen in these figures when it is noted that although, at the end of 1949, the number of wells was greater than a year earlier by 72 per cent the quantity of crude delivered was greater by only about 20 per cent. It is a little ironic that until these allowables can be modified or removed every new well means less delivery from other wells.

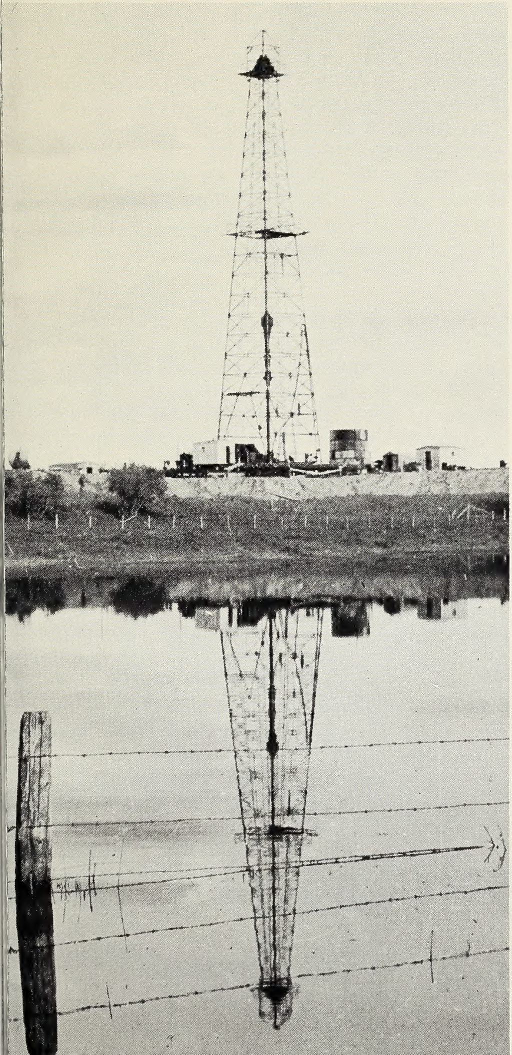
The year was made notable in oil history by a number of discoveries some of whose true worth has yet to be evaluated. Most headline-hitting of these was the Golden Spike where the exploring drill bit into no less than 545 feet of pay sand and the well was brought into production with a flush flow of 12,000 barrels a day.

Imperial's discovery of the Normandville well near Peace River town was sensational for the present mostly on account of its location, far from all the previously established fields.

Other discoveries commanding attention during the year occurred around Stettler, Joseph Lake (20 miles east of Leduc), Barrhead and Bon Accord (between Leduc and Redwater), Excelsior (about 15 miles north of Edmonton) and Campbell (approximately seven miles south of Edmonton).

Leduc

The Leduc field continues to be the prodigious infant amongst the Alberta oilfields. Born only three years ago and yielding 372,427 in its first ten and a half months, its production for 1949 amounted to 9,688,784 barrels to make it the most prolific of all the Alberta fields. At the close of the year there were 351 operating wells in the field giving a daily average of 25,454 barrels as compared with 172 wells averaging 21,326 barrels at the end of the preceding year. The apparent falling off in daily average production per well is explained by curtailment through market allowables which will be eliminated by completion of Interprovincial's pipeline.



After three years' operation the boundaries of the Leduc field are still not delimited. In the autumn of the year under review Ross-Leduc No. 1 was completed in the west dip of the structure at the daily oil potential of 720 barrels and went into production. Ross-Leduc No. 2 reached the D-3 at 5,201 feet a quarter of a mile further west and also came into steady production. To the northwest of this field is the Golden Spike No. 1 with its amazing thickness of 545 feet of pay sand and the still more amazing No. 5 brought in late in January, 1950 — a two-zone producer with 560 feet thickness. These and like successes open up new prospects to the west of the main field whose potential is rated at about 250 million barrels.

Here as in other Alberta fields the refineries' unavoidable resort to marketing allowables set a limit to deliveries, in spite of which the latter were practically double those of the preceding year. In addition, Imperial's Regina refinery was shut down most of December for periodic overhaul and cleaning, as also was British American's Moose Jaw refinery. Return of the former "on stream" toward the end of that month permitted not only resumption of the flow but also raising of allowables from 80 to 105 barrels effective January 1 from the D-3 of the Leduc-Woodland field; from 55 barrels to 65 from the D-2 and Cretaceous zones; from 60 to 65 barrels in the Joseph Lake sector; from 225 to 300 barrels from Golden Spike's D-3. Redwater allowables were reduced from 70 barrels to 65.

Redwater

With reserves estimated at 500 million barrels this field was discovered in September, 1948, with the reputation of being the greatest field to be found in years; not in Alberta, not in North America but in the world.

In the first statistical period of its life as a field in its own right (October-December, 1948) Redwater produced 36,875 barrels. Its output in the same period a year later was 1,678,010 barrels and 4,793,491 barrels for the complete year.

Before discovery of the Golden Spike, thickness of the pay zone in the northwest Redwater field was considered to be somewhat phenomenal at 152 feet.

Turner Valley

Although during 1949 the venerable Turner Valley field's output continued the shrinkage which set in after 1942, it was nevertheless third amongst Alberta's producing fields. Its 1949 output was 4,304,063 barrels to bring its cumulative total in 35 years of service, including two wars, to 102,155,970 barrels.

While the tempo of oil production in the foothills tends to drag as compared with the fevered pace of the early thirties, nevertheless five new wells were brought in in the Valley during 1949 — Home Millarville 34 and 35 and Royalite 72, 88 and 89.

In presenting to the Board of Utility Commissioners an application from the Valley Pipeline Company, Limited, for an increase of rates, Gordon A. Connell, chief petroleum engineer for Royalite, told the Board that Turner Valley can be counted on for 30 million barrels more in the next 20 years or even more by secondary recovery methods now in the experimental stage. Mr. Connell estimated production from 1949 to 1960 inclusive at 31,042,200 barrels and allowed several million more barrels in the decade 1960-70.

The foregoing does not take account of possible new discoveries in the foothills. Exploration, however, has so far failed to reveal these save in the Pincher Creek area whose "wet gas" potential is estimated at an equivalent of 25 million barrels of light oil.

Panoramic view of Redwater, centre of Northern oil field.

Lloydminster

Producing 716,941 barrels in 1949, the Lloydminster field showed a slight increase over the preceding year and more than double its previous high mark in 1947.

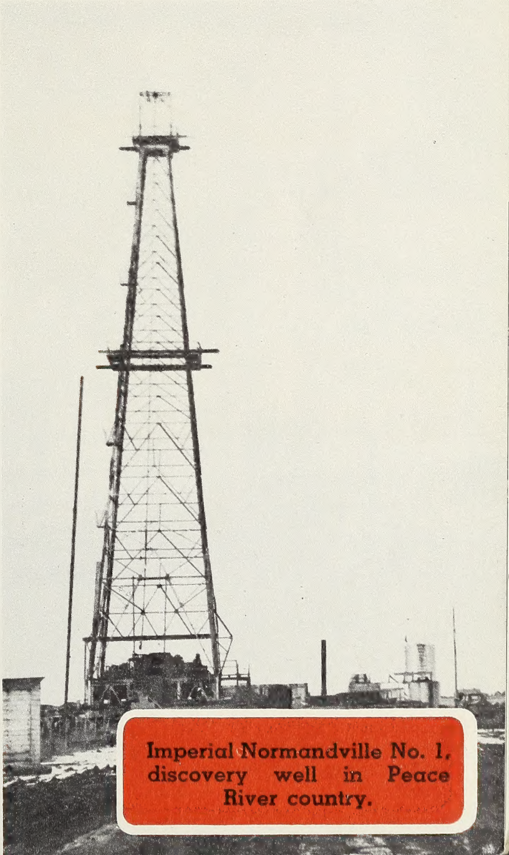
During the year the two transcontinental railways together converted 166 coal burning to oil burning locomotives, thus extending the market for the "black oil" for which the Lloydminster field is notable. The product has been found eminently satisfactory as locomotive, steamship and diesel fuel as well as for road surfacing, but the handicap remains of inaccessibility to markets under prevailing conditions. Producers in the field have asked the Dominion government to consider a freight rate subvention and a rebate of the eight per cent fuel oil tax, but in the meantime the field is not operating to capacity.

North Alberta

In October Imperial's Normandville discovery at 6,700 feet gave rise to new promise for petroleum in the Peace River country, some 300 miles northwest of Edmonton. At the turn of the year the company commenced operations on another venture 40 miles southeast of Peace River town and about 20 miles southeast of the Normandville discovery.

The Normandville well had been preceded by three less successful attempts — at Spirit River, Wembley and Clairmont — but they were all dry holes. The Normandville well, on the other hand, produced 971 barrels in its first half month from a 25-feet thick Devonian limestone before it was shut in while loading facilities were provided to carry the product to railhead.

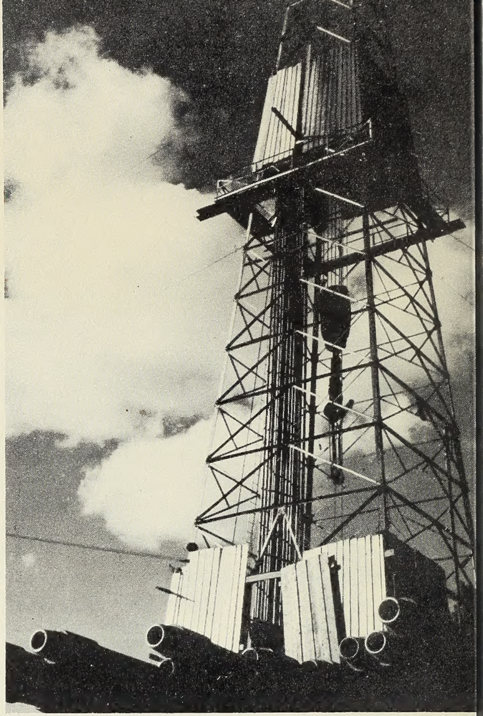
By the end of the year the Alberta government had granted oil and gas rights to the amount of some 20 million acres in the Peace River country. Shell, already operating the Runaway Lake venture, made another location on the Muskwa River. A dozen companies were engaged in exploration in the Peerless Lake-Loon River area, 55 miles north of Lesser Slave Lake and 200 miles northwest of Edmonton. Still further afield were operations at Keg River Post, 108 miles northwest of Peace River, the Union Oil Company's venture at Fort Vermilion, and, most northerly of them all, Shell's operations east of Hay River.

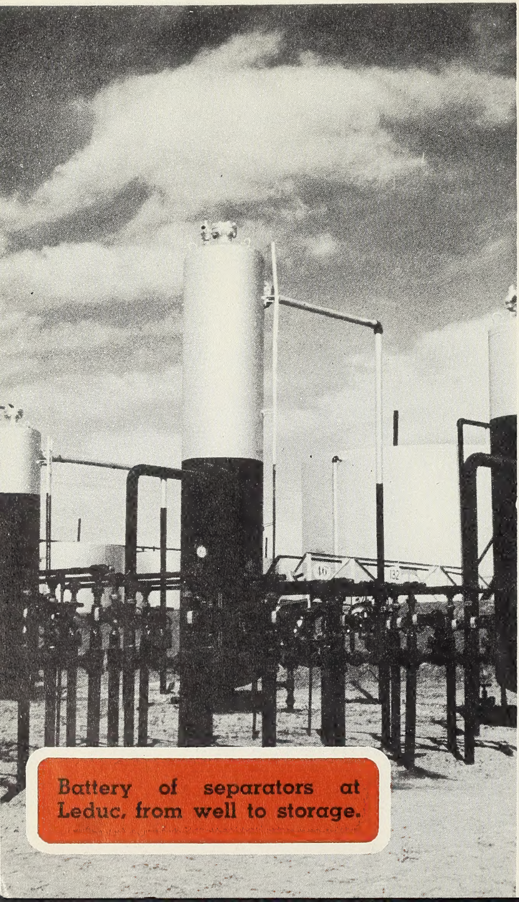


Imperial Normandville No. 1, discovery well in Peace River country.

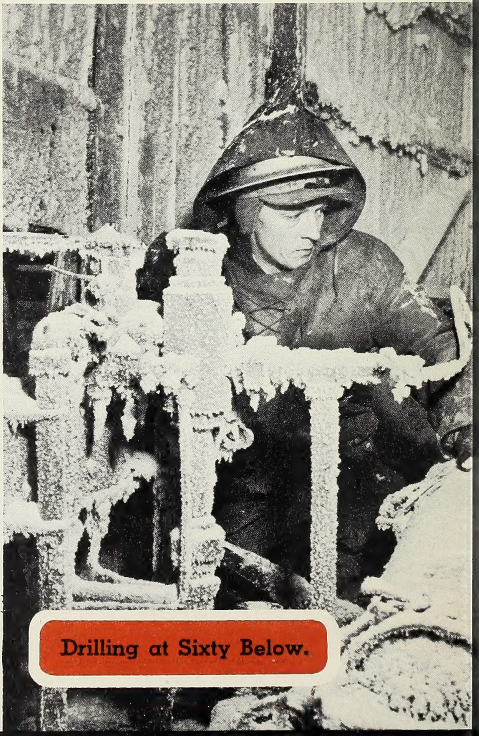
Other Fields

It will be noted from Table F that while the Taber, Conrad, Princess, Vermilion and Wainwright fields show shrinkages ranging from 6 to 35 per cent, the group comprising Miscellaneous showed a remarkable increase of output amounting to 582 per cent. This group includes such new discoveries as Golden Spike, Stettler, Joseph Lake, Normandville and others whose possibilities cannot yet be assessed though some of them may become major fields. In five months Golden Spike produced 61,888 barrels and in nine months Joseph Lake yielded 35,858 barrels.





Battery of separators at Leduc, from well to storage.



Drilling at Sixty Below.

Canadian OIL PRODUCTION

Of all the petroleum produced in Canada during the year under review, 95 per cent was the output of Alberta. This is clear from the following figures supplied by the Dominion Bureau of Statistics (¹):

	1948		1949 (²)	
	bbl.	$	bbl.	$
New Brunswick	21,372	29,920	19,600	62,524
Ontario	176,989	608,109	265,000	922,200
Saskatchewan	849,166	976,541	800,000	800,000
Alberta	10,888,592	35,127,751	20,935,200	60,048,610
Northwest Territories	350,541	676,574	200,000	200,000
	12,286,660	37,418,895	22,219,800	62,233,334

Although not yet numbered amongst the producers, two new adventurers, Manitoba and British Columbia, entered the oil scene during the year. Two or three geophysical parties were working in the southwest corner of Manitoba, contiguous to Saskatchewan, were transferred temporarily to Alberta fields where winter climatic conditions were less rigorous. In British Columbia the search for oil is no longer new. The first oil seeker was the British Columbia government itself under Mr. Pattullo's premiership, which sank a well at Commotion Creek in the Peace River Block, only to abandon it. New interest is revived by recent discoveries in the Alberta Peace River.

More recently the Pacific coast has received a good deal of attention, focussed first on Graham Island in the Queen Charlottes where Royalite and Pacific Petroleums (an independent British Columbia company) teamed up to explore the lower Cretaceous and Jurassic formations at 5,000 feet But this is only a small section of the picture, for the companies have holdings near Ladysmith on Vancouver Island and on Galliano, Salt Spring, Thetis, South Pender, North Pender, Veldex, Gabriola, Provost, Mayne and Saturna islands in the Gulf Group. Early in 1950 a San Francisco company secured a permit to explore 35,000 acres between Williams Lake and Quesnel on the mainland.

At present most of British Columbia's petroleum products and some crude are imported from California, the latter for processing at refineries in and around Vancouver.

Exploration continued in the Gaspe Peninsula of Quebec, and there are reports of renewed activity in and about Dorchester and Westmorland counties of New Brunswick and in Hillsborough parish. Operations in the first-named include deepening an existing well from 5,669 to 12,000 feet if necessary.

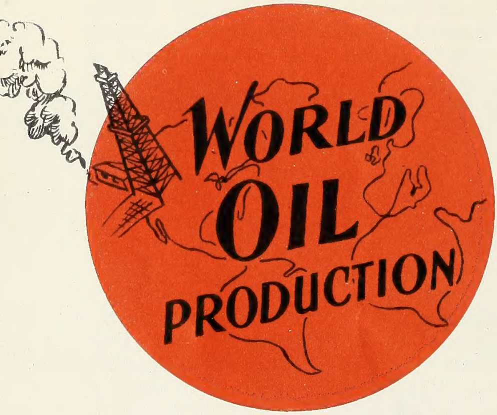
In Ontario the production curve continued the upward course which set in after 1945, and in 1949 reached an estimated 265,000 barrels valued at $922,200. This compares with 176,989 barrels in 1948 valued at $608,109. The increased production for 1949 may be credited to activity by Imperial Oil Limited which drilled nine wells in Sombra township.

(¹) Dominion and provincial statistics are not always compiled from the same basis, hence may not necessarily agree in all particulars.

(²) Preliminary estimates.

Revival of the search for oil in Ontario commenced in 1932 and 1933 and by 1938 production had reached 40,430 barrels — the highest mark since the 1898 record of 66,404 barrels.

In those early days there was no attempt at conservation as it is now understood and no records were kept, but it is estimated that since Ontario's oil beginnings between 18,000 and 19,000 wells have been drilled, nearly all of them long since abandoned. The number of operating wells now approaches 2,000 of which the greater part is in the two major fields, Petrolia and Oil Springs.



World oil production in 1949 was down from the preceding year by a daily average of 21,000 barrels to 9,332,000. This means in round figures about 3,406 million barrels as compared with 3,413 millions.

The United States was again the unchallenged world leader with a daily average of 5,040,000 barrels. A poor second was Venezuela with 1,325,000, although in continental terms South America had a slight advantage. But it will be noted that both the United States and Venezuela, both North and South America produced rather less in the year under review than in its predecessor. In the case of the United States the figure represents a decrease also from 1947.

Trinidad, Alberta's competitor for Empire leadership, showing an increase at 56,000 barrels daily, was almost neck and neck with this province's 55,500, although the source of these figures (1) understates Canadian production as compared with those of the Dominion Bureau of Statistics.

The U.S.S.R.'s daily average of 690,000 barrels was in excess of four times that of the whole of the rest of Europe. Only Roumania approached the Russian daily average with 85,000 barrels.

The critical Middle East contributed 1,435,000 barrels daily, about 15 per cent of world supply. In this the three heaviest participants were Iran with 556,000 barrels daily, Saudi Arabia with 477,000 barrels daily and Kuwait with 242,000.

In the Far East, Indonesia, ravaged by the Pacific campaign of World War II, has made a remarkable recovery to yield a daily average of 131,300 barrels. This is still below the daily average of ten years earlier but, to be appreciated, it must be compared with 1948's average 87,300 and 1947's 22,200.

Of the world's 3,406 million barrels the Americas contributed 76,720 millions in 1949, the greater part from the southern continent.

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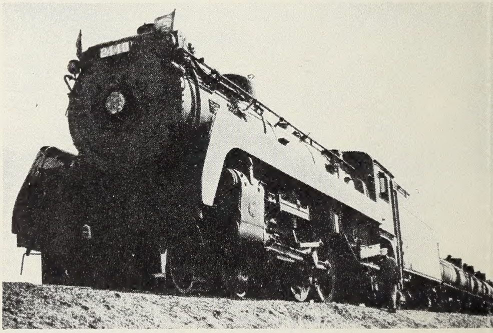
(1) World Petroleum.



Photographs by Imperial Oil Limited
and the Government of Alberta.

Natural GAS

More than the usual rather cursory attention was focussed on natural gas during the year. This interest had its genesis in part in a number of proposals to pipe gas out of Alberta, giving rise to the question of the extent to which this could be done without overdrawing on the domestic requirement and to inquiries into this and the whole gas situation by a royal commission under the chairmanship of Mr. R. J. Dinning.

It seems to be the concensus of the best qualified opinion that exploration for gas for its own sake has not yet been seriously undertaken — that most of the present sources have been discovered in the course of the search for oil.

> There can be no doubt (commented the Dinning commission) that exploratory and development activity made only in the search for oil does not add as rapidly to the known reserves as would occur if the market for oil were supplemented by a market for gas.

The most important development of 1949 occurred in the Pincher Creek field, discovered in 1948, which became a major gas field.

Production of natural gas in Alberta in 1949 amounted to 67,105,102 Mcf.

Typical gas boilers showing (left) jets.

Conclusion

We have seen how after five years of dwindling production, the Alberta oil output, in 1948, registered an increase of some sixty percent over the preceding year. Also, how in 1949, the output was very little less than double that of 1948.

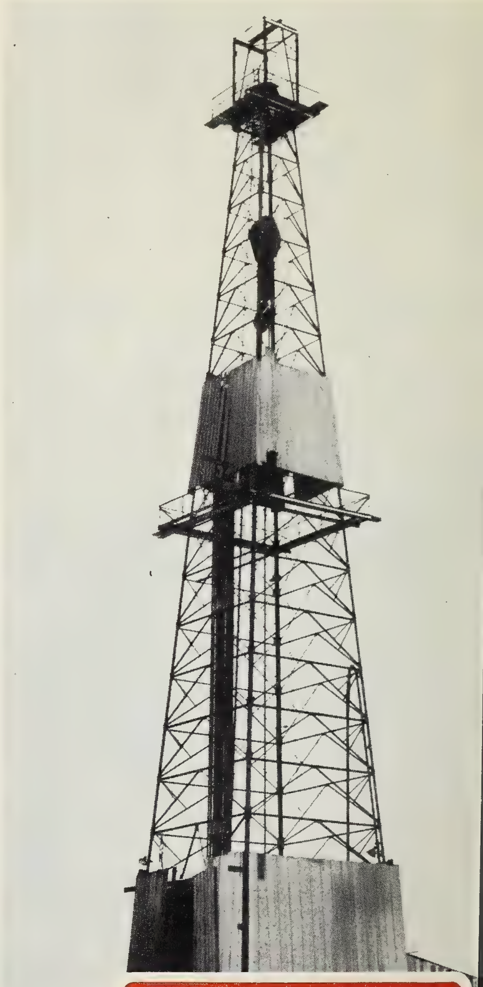
These figures, significant in themselves, take on new importance when read along with ***World Petroleum's*** estimate that in 1949 world production at 3,406 million barrels was less by 16 million barrels — the first time since 1942 that production was not more than in the previous year.

Alberta, indeed, has become beyond question a hot spot in the world oil picture. Perhaps the hottest. It will not be long, if the time has not already come, when Alberta will have a more stable if not more important place in the oil world than the Middle East.

Strategically, Alberta oilfields are less vulnerable, beyond reach of foreign control and with access to economical transportation (also an important factor in peace time) not subject to capture or destruction by enemy action.

From the standpoint of economics, the effect of this growing production on the U.S. dollar situation is apparent. This was discussed in the November monthly letter of the Royal Bank in these terms:

> Canada has always had to import the bulk of the petroleum products she used. The cost two years ago, when sixty per cent of our petroleum came from the United States, was $258 millions, all of which came out of our very small fund of United States exchange. The Alberta discoveries may save $50 millions a year of United States money hitherto spent on oil. If it should be possible to triple Alberta's production we should be independent of United States supplies . . . Alberta, of course, is realizing a large new income as a result of these discoveries. The government revenues have been increased by the sale of Crown lands and by royalties on production. There has been increased employment and business has prospered because of big expenditures for exploration and development.



Schoepp No. 1, Golden Spike discovery well.

The condition which arrived late in 1948, wherein the Alberta wells were, as was facetiously stated, producing "too much oil" — i.e., more than the refineries' capacity to handle — continued, as has been explained in these pages, throughout 1949, and is expected to continue until completion of the Interprovincial pipeline to Regina in or about the fall of 1950. Until then Alberta wells must necessarily be handicapped by market allowables which now prevent their working to anything approaching capacity which, it has been said, could be as much as 125,000 barrels a day.

But the importance of pipeline transportation has yet another facet — the price of the product to the consumer. This was dealt with by Mr. T. S. Johnston, Interprovincial's vice-president, speaking before the Association of Professional Engineers and the Winnipeg branch, at Winnipeg, of the Engineering Institute of Canada, as follows:

> If the oil is to reach greater consuming areas and serve more people the handicap of high cost transportation must be overcome . . . Tank cars carry a relatively small quantity —say 200 barrels, and if we were to move about 100,000 barrels a day it would take a train of 500 cars. If we multiply that by 365 . . . you can imagine the investment necessary for such a movement day in and day out with the attendant time required to load and unload these cars.

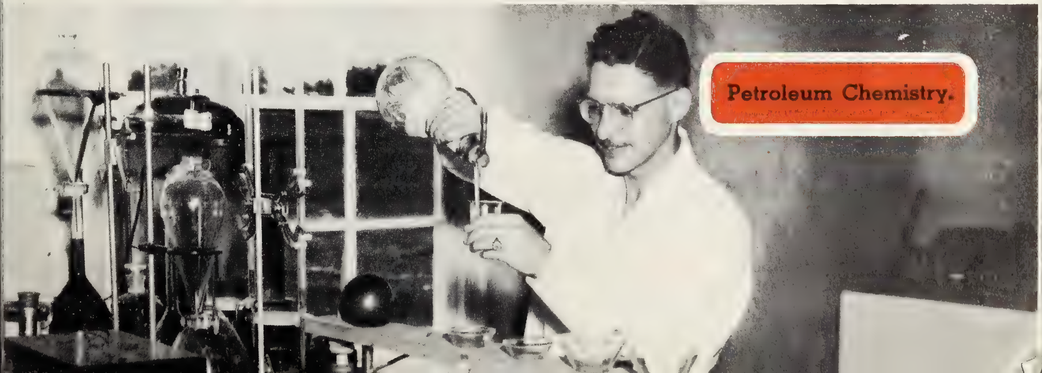
From the islands of the Pacific to the eastern side of the Manitoba-Saskatchewan boundary one of the world's most intense explorations for oil went on last year, and during the coming year this promises to be still further multiplied. Ninety-five percent of this activity was concentrated in Alberta. Every major oil company, Canadian and American, as well as numerous independent companies, was in the field and the sums they spent in exploration and development were almost fantastic. For example, over $25 millions were thus spent in 1947. In 1948, $50 millions. In 1949, over $100 millions. No one can doubt that another record expenditure will be devoted to development in 1950.

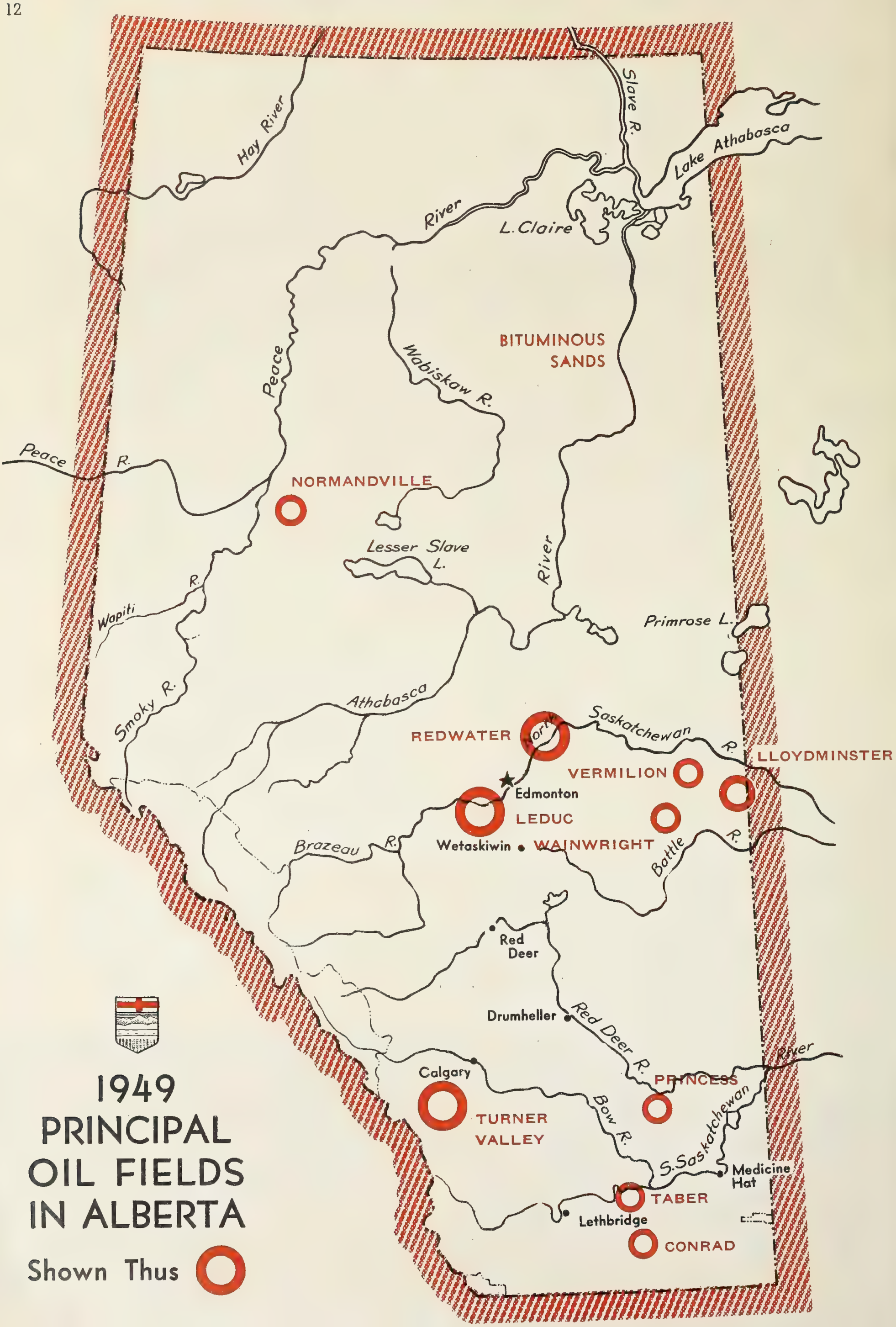
What the Alberta production will be a year from now therefore resolves itself into a species of algebraic proposition whose terms are somewhat as follows: If present daily averages are around 60,000 barrels; and if the present Alberta refinery capacity of 37,500 barrels (1) a day is augmented by three new refineries now projected (2) having a total capacity of 11,500 bpd; and if the Interprovincial pipeline, with a daily initial capacity of 95,000 barrels is operating in the fall; and if new wells are brought into production (3) even at no greater rate than in 1949, the production figure at the close of 1950 is the Unknown Quantity.

(1) Does not include the Husky refinery (7,500 bpd) which is on the Saskatchewan side of the Lloydminster field.

(2) British American, Edmonton, 5,500 bpd; McColl-Frontenac, Edmonton, 5,500 bpd; Supreme, Calgary, 500 bpd.

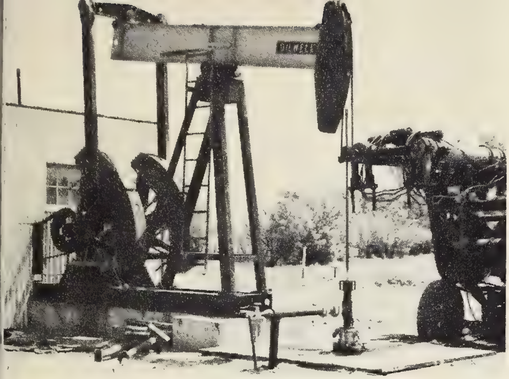
(3) In 1949 there were 784 wells brought to completion in all parts of Alberta, with 519 producers and 215 abandonments. Of the completions, 48 were gas wells and two con densate wells.


Petroleum Chemistry.



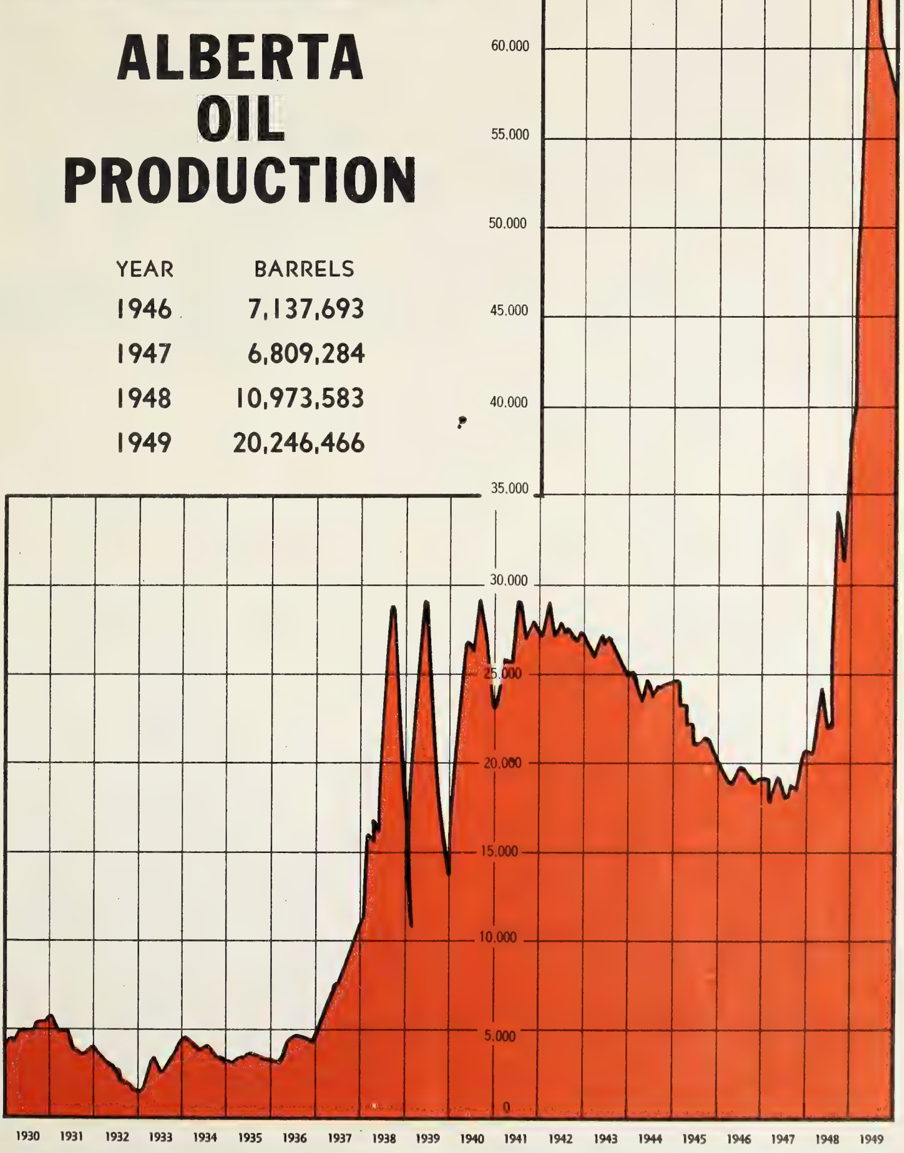
1949 PRINCIPAL OIL FIELDS IN ALBERTA

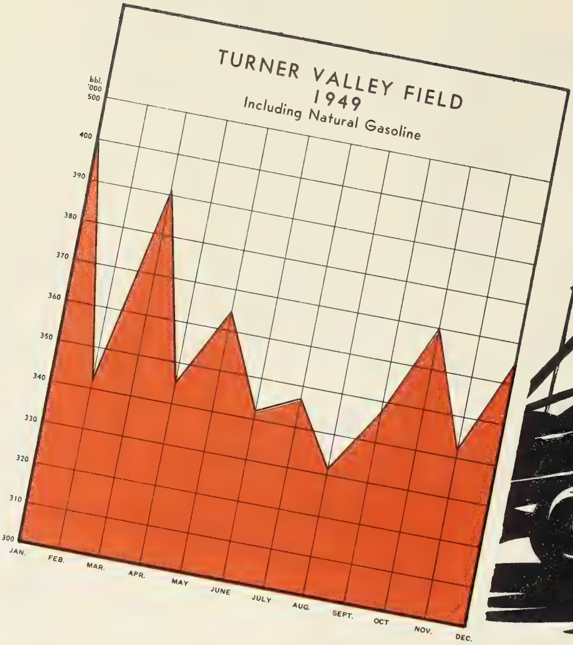
Shown Thus ○



ALBERTA OIL PRODUCTION

YEAR	BARRELS
1946	7,137,693
1947	6,809,284
1948	10,973,583
1949	20,246,466

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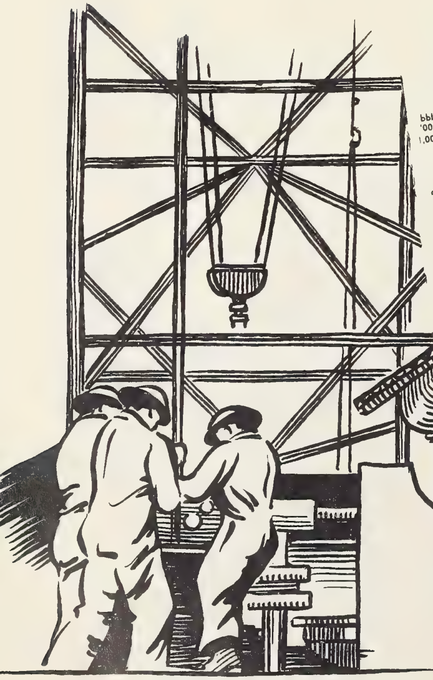

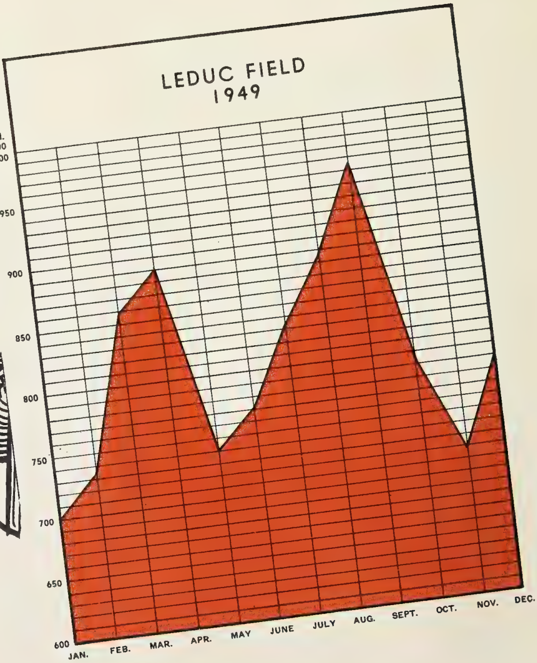
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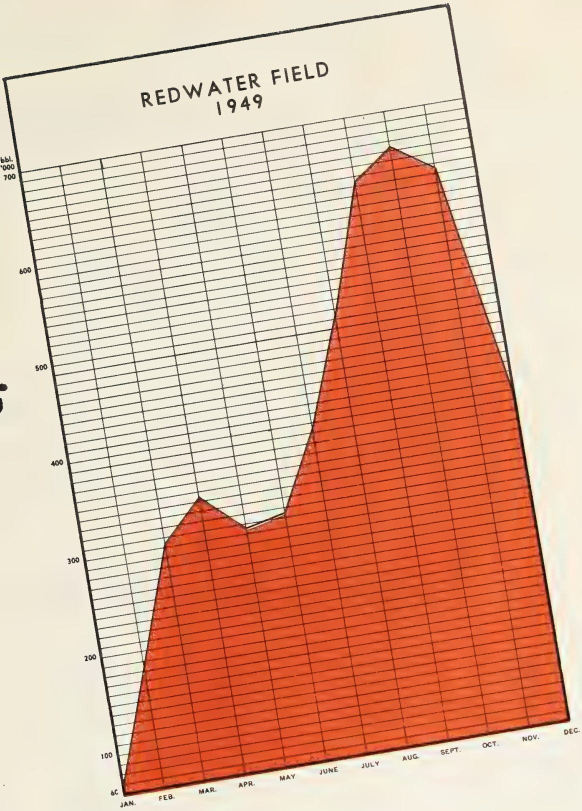
REDWATER FIELD
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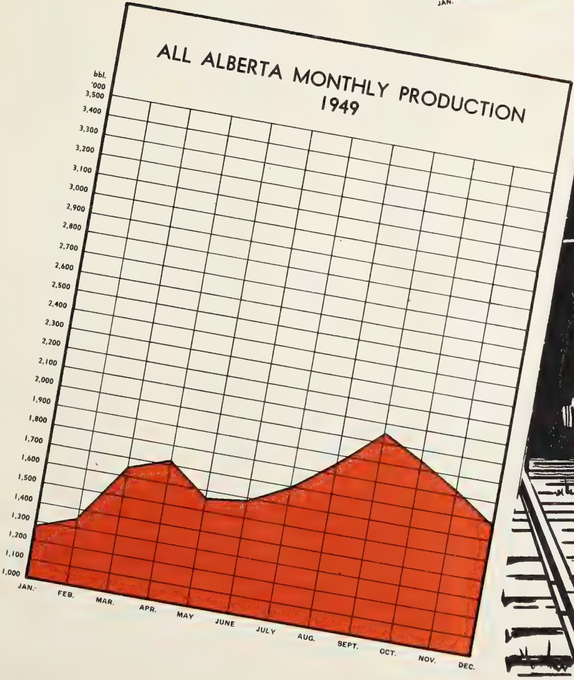
ALL ALBERTA MONTHLY PRODUCTION
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Table A

ALBERTA OIL PRODUCTION

			Increase		Daily Averages	
	1948	1949	bbl	percent	1948	1949
January	687,447	1,280,086	592,639	86	22,176	41,293
February	665,724	1,352,129	686,405	103	22,956	48,290
March	709,099	1,651,012	941,913	133	22,874	53,259
April	702,688	1,714,049	1,011,361	144	23,423	57,135
May	804,531	1,581,619	777,088	96	25,953	50,019
June	900,508	1,591,260	690,752	76	30,017	53,042
July	1,034,437	1,689,924	655,487	63	33,369	54,514
August	1,104,113	1,870,528	766,415	69	35,617	60,339
September	978,018	2,051,148	1,073,130	109	32,601	68,371
October	1,076,512	1,950,666	874,154	81	34,726	62,924
November	1,139,160	1,821,251	682,091	60	37,972	60,708
December	1,171,346	1,692,794	521,448	40	37,785	54,606
Totals	10,973,583	20,246,466	9,272,883	84	29,982	55,469

Table B

OIL PRODUCTION FROM THE LEDUC FIELD

1949	Blairmore	D-2	D-3	Totals
January	15,515	139,037	552,840	707,392
February	17,760	132,823	584,566	735,149
March	17,902	159,563	682,871	860,336
April	17,634	173,192	703,028	893,854
May	19,478	147,056	573,809	740,343
June	22,798	150,119	604,296	777,213
July	19,276	171,196	644,515	834,987
August	17,720	182,955	684,950	885,625
September	18,001	205,375	730,046	953,422
October	16,082	180,016	597,178	793,276
November	12,264	160,454	545,389	718,107
December	8,213	183,587	597,280	789,080
Totals	202,643	1,985,373	7,500,768	9,688,784

1948	Blairmore	D-2	D-3	Total
January	------	35,324	86,973	122,297
February	------	37,236	103,907	141,143
March	------	52,275	121,055	173,330
April	------	51,026	128,601	179,627
May	------	13,435	254,806	268,241
June	------	50,146	348,683	398,829
July	------	68,157	456,781	524,938
August	2,447	81,411	499,299	583,157
September	5,080	96,171	360,325	461,576
October	6,215	115,495	404,187	525,897
November	11,771	127,437	478,022	617,230
December	15,442	135,219	510,465	661,106
Totals	40,955	863,332	3,753,104	4,657,371
Totals, 1949	202,643	1,985,373	7,500,768	9,688,784
Inc. or Dec.	161,688	1,122,041	3,747,664	5,031,413
Percent	395	130	99	109

Table C

PRODUCTION FROM THE REDWATER FIELD

			Increase	Daily Average bbl.	
	1948	1949	bbl.	1948	1949
January	-----	68,446	68,446	---	2,208
February	-----	184,253	184,253	---	6,580
March	-----	300,770	300,770	---	9,702
April	-----	343,540	343,540	---	11,541
May	-----	315,215	315,215	---	10,168
June	-----	323,618	323,618	---	10,787
July	-----	396,714	396,714	---	12,797
August	-----	549,947	549,947	---	17,966
September	-----	632,978	632,978	---	21,099
October	8,772	662,413	653,641	283	21,368
November	11,137	631,590	620,453	379	21,053
December	16,966	384,007	367,041	547	11,851
Totals	36,875	4,793,491	4,756,616	400	13,133

Table D

TURNER VALLEY PRODUCTION

1949	Limestone Zone	Shallow Zone	Natural Gasoline	Total
January	355,682	136	47,276	403,094
February	298,966	125	44,013	343,104
March	346,852	154	45,178	392,184
April	311,782	110	34,775	346,667
May	332,131	99	34,925	367,155
June	310,377	10	32,781	343,168
July	316,302	122	32,377	348,801
August	298,999	110	32,276	331,385
September	315,367	97	33,502	348,966
October	325,802	78	44,744	370,624
November	300,093	76	42,471	342,640
December	312,992	81	53,202	366,275
Totals	3,825,345	1,198	477,520	4,304,063
1948				
January	424,786	324	41,319	466,429
February	379,738	323	39,237	419,298
March	401,687	323	41,678	443,688
April	386,318	354	43,073	429,745
May	385,779	298	34,817	420,894
June	340,601	277	30,427	371,305
July	345,289	334	32,112	377,735
August	351,456	258	32,618	384,332
September	346,366	215	32,490	379,071
October	366,869	257	41,078	408,204
November	349,816	255	47,106	397,177
December	349,983	178	52,700	402,861
Totals	4,428,688	3,396	468,655	4,900,739
Totals, 1949	3,825,345	1,198	477,520	4,304,063
Inc or Dec.	—603,343	—2,198	+8,865	—596,676
Percent	14	64	2	12

Table E

PRODUCTION FROM THE LLOYDMINSTER - LONE ROCK FIELD

	ALBERTA SIDE		SASKATCHEWAN SIDE (a)		LONE ROCK (a)		OTHER SASKATCHEWAN FIELDS (a)		COMBINED FIELD	
	Operating Wells	Barrels	Operating Wells	Barrels	Operating Wells	Barrels	Operating Wells	Barrels	Operating Wells	Barrels
January	68	46,492	52	27,246	31	23,868	1	617	152	98,223
February	61	41,386	46	27,770	32	23,507	1	665	140	93,328
March	63	48,909	46	28,188	34	30,469	1	633	144	108,199
April	68	67,997	62	37,841	37	37,050	--	------	167	142,888
May	60	84,692	67	47,916	39	41,551	1	1,345	167	175,504
June	87	77,264	69	45,200	38	35,598	1	1,147	195	159,209
July	83	60,136	64	34,277	35	19,735	1	901	183	115,049
August	83	53,799	59	35,704	33	21,405	1	444	176	111,352
September	91	61,079	57	37,974	37	35,352	--	------	185	134,405
October	83	61,093	54	31,209	38	35,832	2	512	177	128,646
November	98	52,238	61	29,319	42	29,611	3	1,977	204	113,145
December	76	61,856	53	26,388	39	28,405	3	1,562	171	118,211
Totals		716,941		409,032		362,383		9,803		1,498,159

ANNUAL TOTALS

	ALBERTA SIDE	SASKATCHEWAN SIDE (a)	LONE ROCK (a)	OTHER SASKATCHEWAN FIELDS (a)	COMBINED FIELD
1939	348	-------	-------		348
1940	1,648	331	-------		1,979
1941	416	-------	-------		416
1942	477	-------	-------		477
1943	2,640	-------	-------		2,640
1944	6,296	-------	-------		6,296
1945	28,321	16,507	-------		44,828
1946	76,187	136,874	-------		213,061
1947	304,236	535,034	-------		839,270
1948	648,055	548,801	297,305	-----	1,494,161
1949	716,941	409,032	362,383	9,803	1,498,159
Totals	1,785,565	1,646,579	659,688	9,803	4,101,635

(a) Figures supplied by the Saskatchewan Government Department of Natural Resources and Industrial Development.

Table F

PRODUCTION FROM FIELDS OTHER THAN THE FOREGOING

1949	Taber	Conrad	Princess	Vermilion	Wainwright	Misc.	Totals
January	15,405	14,453	10,998	8,716	1,295	3,795	54,662
February	14,120	13,104	9,415	7,379	998	3,221	48,237
March	13,404	14,298	9,250	7,938	1,479	2,444	48,813
April	14,197	13,722	8,413	8,175	1,402	16,082	61,991
May	14,028	14,117	10,485	8,846	1,714	25,024	74,214
June	15,556	14,083	10,534	8,488	1,417	19,919	69,997
July	9,639	7,723	9,922	7,216	1,226	13,560	49,286
August	6,865	8,543	8,402	7,411	1,098	17,453	49,772
September	6,940	8,783	7,933	5,820	2,094	23,133	54,703
October	9,622	10,322	8,380	5,556	1,185	28,195	63,260
November	14,875	10,201	17,322	6,140	1,533	26,605	76,676
December	16,095	10,379	10,173	5,248	645	49,036	91,576
Totals	150,746	139,728	121,227	86,933	16,086	228,467	743,187
Totals, 1948	201,527	179,627	186,393	(a) 112,331	(a) 17,131	33,534	(a) 730,543
Increase or Decrease	—50,781	— 39,899	— 65,166	— 25,398	— 1,045	+ 194,933	+ 12,644
Percent	25	22	35	23	6	582	2

1948	Taber	Conrad	Princess	Vermilion	Wainwright	Misc.	Totals
January	16,997	16,529	15,361	(a) 9,648	1,292	3,362	63,189
February	15,748	15,045	12,997	(a) 9,704	1,309	2,471	57,274
March	16,701	15,756	11,640	10,517	937	1,834	57,385
April	17,580	15,413	10,924	9,458	1,065	1,637	56,077
May	18,947	15,491	14,685	9,870	1,519	2,144	62,656
June	17,770	14,651	19,555	9,274	1,557	2,052	64,859
July	16,992	15,074	17,186	7,779	1,595	1,266	59,892
August	17,856	14,955	17,753	9,196	1,248	4,638	65,646
September	16,662	13,086	17,407	8,977	2,696	3,339	62,167
October	15,685	14,828	17,456	11,001	1,714	4,770	65,454
November	15,063	14,347	17,729	7,723	1,380	4,202	60,444
December	15,526	14,452	13,700	9,184	819	1,819	55,500
Totals	201,527	179,627	186,393	112,331	17,131	33,534	730,543

(a) Revised since 1948 Review.

Imperial's crude distillation plant, Edmonton.

Street scene in Leduc.

Table G

ANNUAL OIL PRODUCTION TOTALS

1914 TO 1948 INCLUSIVE
(In barrels of 35 imperial gallons)

1914-21	56,675
1922	15,796
1923	10,003
1924	17,749
1925	180,885
1926	219,598
1927	332,312
1928	489,532
1929	999,523
1930	1,436,259
1931	1,454,816
1932	918,154
1933	1,012,784
1934	1,266,049
1935	1,263,968
Carried Forward	9,674,103
Brought Forward	9,674,103
1936	1,320,428
1937	2,796,874
1938	6,743,101
1939	7,543,492
1940	8,495,207
1941	9,908,643
1942	10,136,296
1943	9,674,548
1944	8,788,726
1945	8,055,440
1946	7,138,532
1947	6,809,284
1948	10,973,583
1949	20,246,466
Total	128,354,723

HISTORICAL SUMMARY OF DRILLING

Year	Leduc	Turner Valley	Other Areas	Totals
Prior to 1927	--------	115,391	532,241	647,632
1927	--------	53,340	31,626	84,966
1928	--------	111,160	56,380	167,540
1929	--------	240,020	130,577	370,597
1930	--------	123,583	105,751	229,334
1931	--------	61,939	54,613	116,552
1932	--------	13,096	19,525	32,621
1933	--------	51,806	20,043	71,849
1934	--------	78,278	17,946	96,224
1935	--------	27,462	33,011	60,473
1936	--------	52 470	46,145	98,615
1937	--------	245,531	46,423	291,954
1938	--------	303,112	60,180	363,292
1939	--------	281,274	93,013	374,287
1940	--------	297,018	72,779	369,797
1941	--------	377,860	113,410	491,270
1942	--------	348,772	160,915	509,687
1943	--------	244,535	243,399	487,934
1944	--------	266,145	331,683	597,828
1945	--------	159,049	384,388	543,437
1946	--------	77,997	323,923	401,920
1947	119,787	78,338	684,232	882,358
1948	901,406	69,914	692,287	1,663,607
1949	1,021,836	39,159	2,140,902	3,201,897
Totals	2,043,029	3,709,149	6,395,392	12,147,570

Table H

FOOTAGE OF WELLS DRILLED, 1949

	Leduc 1949	Turner Valley 1949	Redwater 1949	Other Fields 1949	Totals 1949	Totals 1948
January	84,075	8,077	-------	69,195	161,347	67,982
February	86,798	4,746	25,513	63,905	178,131	67,972
March	111,699	3,812	43,906	74,967	234,083	112,544
April	114,293	2,954	82,525	82,961	282,733	115,544
May	117,294	891	93,668	97,835	309,688	83,570
June	91,290	2,554	88,722	119,424	302,280	180,195
July	72,482	2,950	95,127	114,967	285,526	147,418
August	79,170	3,779	114,054	123,083	318,028	195,783
September	46,974	3,039	143,341	100,239	293,593	175,258
October	73,526	3,677	128,018	106,677	311,898	192,174
November	85,891	1,812	116,379	97,068	301,150	192,264
December	58,344	868	71,791	92,437	223,440	130,466
Totals	1,021,836	39,159	1,002,844	1,142,758	3,201,897	1,663,687

Table J

WORLD CRUDE OIL PRODUCTION

	1939	1947	1948	1949
North America	(Thousands of Barrels Daily)			
United States	3,465.7	5,085.2	5.508.9	5,040.0
Canada	19.1	21.2	33.8	59.0
Mexico	162.0	159.0	159.0	164.0
North America	3,646.8	5,265.4	5,701.7	5,263.0
South America				
Venezuela	567.0	1,208.0	1,339.0	1,325.0
Colombia	65.5	70.4	65.1	82.0
Argentina	51.0	60.5	63.8	63.5
Trinidad	52.8	56.1	54.9	56.0
Peru	37.1	34.8	37.5	40.0
Ecuador	6.3	6.5	7.4	7.2
Bolivia	0.6	1.0	1.3	1.9
Cuba	0.3	0.6	0.3	0.3
Brazil	------	0.2	0.3	0.3
South America and Caribbean	780.6	1,438.1	1,569.6	1,576.2
Western Hemisphere	4,427.4	6,703.5	7,271.3	6,839.2
Europe				
Roumania	128.5	78.5	79.5	85.0
Austria	11.7	16.9	15.0	18.0
Germany	12.3	11.6	12.3	16.0
Hungary	3.0	12.0	10.0	10.2
Poland	10.7	2.6	2.7	2.7
Netherlands	-----	4.0	9.3	11.6
Albania	2.5	1.5	1.0	2.5
France	1.4	1.0	1.1	1.0
French Morocco	-----	-----	0.3	0.4
United Kingdom	0.1	1.0	0.9	0.9
Czechoslovakia	0.2	0.6	0.4	0.8
Yugoslavia	-----	1.0	1.1	1.1
Italy	0.2	0.2	0.2	0.2
Europe, except U.S.S.R.	170.6	130.9	133.8	150.4
U.S.S.R.	603.0	541.0	611.0	690.0
Europe	773.6	671.9	744.8	840.4
Near and Middle East				
Iran	214.0	424.0	523.0	556.0
Saudi Arabia	10.8	246.0	390.3	477.0
Iraq	84.5	98.0	72.5	85.0
Kuwait	-----	44.6	127.2	242.0
Bahrein	20.8	26.0	30.0	30.0
Egypt	12.8	25.6	36.8	45.0
Near and Middle East	342.9	864.2	1,179.8	1,435.0
Far East and Oceania				
Indonesia	170.0	22.2	87.3	131.3
British Borneo	20.0	35.6	54.0	68.0
New Guinea	-----	-----	-----	4.7
India	-----	-----	-----	4.6
Pakistan	28.0	8.0	7.1	1.7
Burma	-----	-----	-----	1.0
Japan	7.3	3.5	3.1	3.7
China	-----	1.0	1.8	2.0
Far East	225.3	70.3	155.3	217.0
Eastern Hemisphere	1,341.8	1,606.4	2,077.9	2,492.4
World Total	5,769.2	8,309.9	9,353.2	9,331.6

ALBERTA CUMULATIVE OIL PRODUCTION TABLE BY CALENDAR YEARS

(Quantities in Barrels of 35 Imperial Gallons)

Figures in light face represent annual totals, and in **black face** type the cumulative totals up to the end of the calendar year shown in the column in which they appear.

Calendar Years	TURNER VALLEY								LEDUC								REDWATER	
	CRUDE OIL PRODUCTION				Natural Gasoline Recovered		Turner Valley Totals		Blairmore		D-2 Zone		D-3 Zone		Leduc Totals			
	Shallow Zone		Limestone Zone															
1914–21	56,599	**56,599**	------	------	76	**76**	56,675	(a) **56,675**	------	------	------	------	------	------	------	------	------	------
1922	6,559	**63,158**	------	------	9,237	**9,313**	15,796	**72,471**	------	------	------	------	------	------	------	------	------	------
1923	1,943	**65,101**	------	------	8,060	**17,373**	10,003	**82,474**	------	------	------	------	------	------	------	------	------	------
1924	2,932	**68,033**	1,689	**1,689**	13,128	**30,501**	17,749	**100,223**	------	------	------	------	------	------	------	------	------	------
1925	2,926	**70,959**	169,008	**170,697**	8,951	**39,452**	180,885	**281,108**	------	------	------	------	------	------	------	------	------	------
1926	2,609	**73,568**	203,725	**374,422**	7,283	**46,735**	213,617	**494,725**	------	------	------	------	------	------	------	------	------	------
1927	38,808	**112,376**	284,595	**659,017**	5,854	**52,589**	329,257	**823,982**	------	------	------	------	------	------	------	------	------	------
1928	70,910	**183,286**	410,448	**1,069,465**	------	**52,589**	481,358	**1,305,340**	------	------	------	------	------	------	------	------	------	------
1929	73,181	**256,467**	908,411	**1,977,876**	------	**52,589**	981,592	**2,286,932**	------	------	------	------	------	------	------	------	------	------
1930	50,897	**307,364**	1,316,102	**3,293,978**	------	**52,589**	1,366,999	**3,653,931**	------	------	------	------	------	------	------	------	------	------
1931	26,936	**334,300**	1,345,310	**4,639,288**	------	**52,589**	1,372,246	**5,026,177**	------	------	------	------	------	------	------	------	------	------
1932	21,757	**356,057**	854,517	**5,493,805**	------	**52,589**	876,274	**5,902,451**	------	------	------	------	------	------	------	------	------	------
1933	23,915	**379,972**	766,755	**6,260,560**	185,781	**238,370**	976,451	**6,878,902**	------	------	------	------	------	------	------	------	------	------
1934	22,307	**402,279**	796,140	**7,056,700**	414,324	**652,694**	1,232,711	**8,111,673**	------	------	------	------	------	------	------	------	------	------
1935	18,903	**421,182**	711,451	**7,768,151**	496,681	**1,149,375**	1,227,035	**9,338,708**	------	------	------	------	------	------	------	------	------	------
1936	13,011	**434,193**	671,948	**8,440,099**	602,360	**1,751,735**	1,287,319	**10,626,027**	------	------	------	------	------	------	------	------	------	------
1937	10,589	**444,782**	2,098,970	**10,539,069**	657,169	**2,408,904**	2,766,728	**13,392,755**	------	------	------	------	------	------	------	------	------	------
1938	9,192	**453,974**	6,150,512	**16,689,581**	531,434	**2,940,338**	6,691,138	**20,083,893**	------	------	------	------	------	------	------	------	------	------
1939	8,431	**462,405**	7,251,063	**23,940,644**	296,787	**3,237,125**	7,556,281	**27,640,174**	------	------	------	------	------	------	------	------	------	------
1940	7,309	**469,714**	8,173,016	**32,113,660**	274,172	**3,511,297**	8,454,497	**36,094,671**	------	------	------	------	------	------	------	------	------	------
1941	6,014	**475,728**	9,531,207	**41,644,867**	293,122	**3,804,419**	9,830,343	**45,925,014**	------	------	------	------	------	------	------	------	------	------
1942	5,806	**481,534**	9,695,913	**51,340,780**	302,216	**4,106,635**	10,003,935	**55,928,949**	------	------	------	------	------	------	------	------	------	------
1943	4,865	**486,399**	8,986,663	**60,327,443**	461,169	**4,567,804**	9,452,697	**65,381,646**	------	------	------	------	------	------	------	------	------	------
1944	3,209	**489,608**	7,874,919	**68,202,362**	448,186	**5,015,990**	8,326,314	**73,707,960**	------	------	------	------	------	------	------	------	------	------
1945	3,932	**493,540**	7,005,589	**75,207,951**	412,540	**5,428,530**	7,422,061	**81,130,021**	------	------	------	------	------	------	------	------	------	------
1946	8,918	**502,428**	5,928,444	**81,136,395**	434,210	**5,862,740**	6,371,572	**87,501,593**	------	------	------	------	------	------	------	------	------	------
1947	5,058	**507,516**	5,017,292	**86,153,687**	427,225	**6,289,965**	5,449,575	**92,951,168**	------	------	------	------	------	------	372,427	372,427	------	------
1948	3,396	**510,912**	4,428,688	**91,007,161**	468,655	**6,758,620**	4,900,739	**97,851,907**	40,035	**40,035**	863,208	**863,208**	3,753,104	**3,753,104**	4,657,371	**5,029,798**	36,875	**36,875**
1949	1,198	**512,110**	3,825,345	**94,832,506**	477,520	**7,236,140**	4,304,063	**102,155,970**	202,643	**242,768**	1,985,373	**2,848,581**	7,500,768	**11,073,872**	9,688,784	**14,718,582**	4,793,491	**4,830,366**

(a) Estimated. Production from 1914 to 1921 cannot be substantiated in detail, and is probably a minimum figure. Southern Alberta 1, later completed as Dalhousie 1, was the largest producer.

ALBERTA CUMULATIVE OIL PRODUCTION TABLE BY CALENDAR YEARS (Continued)

Calendar Years	PRINCESS		LLOYDMINSTER		WAINWRIGHT		VERMILION		CONRAD		TABER		MISCELLANEOUS		ALBERTA TOTALS		VALUATIONS	
	Heavy Crude		Heavy Crude		Heavy Crude		Heavy Crude		Heavy Crude		Heavy Crude							
1914–21	------	------	------	------	------	------	------	------	------	------	------	------	------	------	56,675	**56,675**	$ 218,200	**$ 218,200**
1922	------	------	------	------	------	------	------	------	------	------	------	------	------	------	15,796	**72,741**	64,047	**282,247**
1923	------	------	------	------	------	------	------	------	------	------	------	------	------	------	10,003	**82,474**	41,333	**323,580**
1924	------	------	------	------	------	------	------	------	------	------	------	------	------	------	17,749	**100,223**	88,095	**411,675**
1925	------	------	------	------	------	------	------	------	------	------	------	------	------	------	180,885	**281,108**	717,271	**1,128,946**
1926	------	------	------	------	5,981	**5,981**	------	------	------	------	------	------	------	------	219,598	**500,706**	914,707	**2,043,653**
1927	------	------	------	------	2,526	**8,507**	------	------	------	------	------	------	529	**529**	332,312	**833,018**	1,529,477	**3,573,130**
1928	------	------	------	------	7,952	**16,459**	------	------	------	------	------	------	222	**751**	489,532	**1,322,550**	1,727,824	**5,300,954**
1929	------	------	------	------	12,332	**28,791**	------	------	------	------	------	------	5,599	**6,350**	999,523	**2,322,073**	3,424,021	**8,724,975**
1930	------	------	------	------	9,739	**38,530**	------	------	------	------	------	------	59,521	**65,871**	1,436,259	**3,758,332**	4,557,473	**13,282,448**
1931	------	------	------	------	7,142	**45,672**	------	------	------	------	------	------	75,428	**141,299**	1,454,816	**5,213,148**	3,977,788	**17,260,236**
1932	------	------	------	------	7,003	**52,675**	------	------	------	------	------	------	34,877	**176,176**	918,154	**6,131,302**	2,606,907	**19,867,143**
1933	------	------	------	------	5,276	**57,951**	------	------	------	------	------	------	31,057	**207,233**	1,012,784	**7,144,086**	2,694,310	**22,561,453**
1934	------	------	------	------	11,779	**69,730**	------	------	------	------	------	------	21,499	**228,732**	1,266,049	**8,410,135**	3,031,446	**25,592,899**
1935	------	------	------	------	14,638	**84,368**	------	------	------	------	------	------	22,295	**251,027**	1,263,968	**9,674,103**	2,856,029	**28,448,928**
1936	------	------	------	------	15,057	**99,425**	------	------	------	------	------	------	18,052	**269,079**	1,320,428	**10,994,531**	2,918,730	**31,367,658**
1937	------	------	------	------	13,459	**112,884**	------	------	------	------	600	**600**	15,432	**284,511**	2,796,874	**13,791,405**	4,913,960	**36,281,618**
1938	------	------	------	------	12,985	**125,869**	------	------	------	------	15,098	**15,698**	16,087	**300,598**	6,743,101	**20,534,506**	8,639,488	**44,921,106**
1939	515	**515**	348	**348**	11,624	**137,493**	202	**202**	------	------	3,720	**19,418**	23,265	**323,863**	7,593,492	**28,127,998**	9,289,580	**54,210,686**
1940	------	**515**	1,648	**1,996**	7,527	**145,020**	10,817	**11,019**	------	------	------	**19,418**	20,718	**344,581**	8,495,207	**36,623,205**	10,503,249	**64,713,935**
1941	19,587	**20,102**	416	**2,412**	11,733	**156,753**	22,051	**33,070**	------	------	5,600	**25,018**	18,913	**363,494**	9,908,643	**46,531,848**	13,809,708	**78,523,643**
1942	10,478	**30,580**	477	**2,889**	14,510	**171,263**	56,819	**89,889**	------	------	29,819	**54,837**	20,258	**383,752**	10,136,296	**56,668,144**	15,517,266	**94,040,909**
1943	340	**30,920**	2,640	**5,529**	18,136	**189,399**	93,258	**183,147**	------	------	88,735	**143,572**	18,742	**402,494**	9,674,548	**66,342,692**	15,724,518	**109,765,427**
1944	13,815	**44,735**	6,296	**11,825**	17,154	**206,553**	234,603	**417,750**	24,733	**24,733**	148,638	**292,210**	17,173	**419,667**	8,788,726	**75,131,418**	14,468,061	**124,233,488**
1945	63,377	**108,112**	28,321	**40,146**	16,472	**223,025**	238,358	**656,108**	143,696	**168,429**	135,000	**427,210**	8,155	**427,822**	8,055,440	**83,186,858**	13,106,928	**137,340,416**
1946	64,953	**173,065**	76,187	**116,333**	15,114	**238,139**	183,946	**840,054**	212,645	**381,074**	206,086	**633,296**	7,190	**435,012**	7,137,693	**90,324,551**	14,348,069	**151,688,485**
1947	106,920	**279,985**	304,236	**420,569**	18,325	**256,464**	138,401	**978,455**	202,929	**584,003**	205,236	**839,371**	11,235	**446,247**	6,809,284	**97,133,965**	18,078,907	**169,767,392**
1948	189,712	**469,697**	648,055	**1,068,624**	17,131	**273,595**	112,331	**1,090,786**	179,627	**763,630**	201,527	**1,040,898**	30,215	**476,462**	10,973,583	**108,107,548**	35,127,751	**204,895,143**
1949	121,227	**590,924**	716,941	**1,785,941**	16,086	**289,681**	86,933	**1,177,719**	139,728	**903,358**	150,746	**1,191,644**	228,467	**704,929**	20,246,466	**128,354,014**	58,999,936	**263,895,079**

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